

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIRONORI AOKI

Appeal 2007-2163
Application 10/049,792
Technology Center 2800

Decided: October 24, 2007

Before BRADLEY R. GARRIS, CATHERINE Q. TIMM,
LINDA M. GAUDETTE, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1-3, 5, 6, 8-13, and 15-18. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

I. BACKGROUND

The invention relates to an array substrate used in a liquid crystal display device (LCD). As stated in the Specification:

A liquid crystal display device typically comprises two insulative substrates facing each other interposing display material such as liquid crystal therebetween, and voltages are applied selectively to the display material. At least either of the substrates is an array substrate on which switching elements, such as TFTs, and pixel electrodes connected to the switching elements are formed, and furthermore, scanning lines (hereinafter "gate lines") and signal lines (hereinafter "data lines") are formed in a matrix like arrangement for providing signals to the switching elements.

(Specification 1:13-21).

Appellant's array substrate includes scanning lines formed of a low resistivity metal such as aluminum or its alloys, and signal lines formed of a high melting point metal selected from the group consisting of chrome, molybdenum, tantalum, and alloys thereof. Claim 1 is illustrative of the subject matter on appeal:

1. An array substrate comprising:

a display area in which pixel electrodes are formed,

a scanning line formed of a low resistivity metal, said scanning line being arranged between the pixel electrodes,

a signal line formed of a high melting point metal selected from the group consisting of chrome, molybdenum, tantalum and alloys thereof, said signal line crossing over the scanning line interposing an insulating layer therebetween,

a terminal to which a scanning signal is applied, and

an extended scanning line for connecting the scanning line with the terminal, said extended scanning line being formed only of the same conductive film as for said signal line.

The Examiner rejects claims 1-3, 5, 6, 8-12, and 15-18 under 35 U.S.C. § 102(b) as anticipated by Dohjo (US 6,078,366), and rejects claim 13 under 35 U.S.C. § 103(a) as unpatentable over Dohjo in view of Sakata (JP 11-284,195).¹

According to Appellant's Brief, both grounds of rejection are to be reviewed on appeal (Br. 3).²

II. DISCUSSION

Anticipation by Dohjo

With respect to the rejection of claims 1-3, 5, 6, 8-12, and 15-18 as anticipated by Dohjo, we first consider the arguments as they apply to claim 1.

The issue on appeal arising from the contentions of Appellant and the Examiner is: Does Dohjo disclose an array substrate having each and every structure recited in claim 1 either expressly or inherently such that Dohjo anticipates the claimed array substrate under 35 U.S.C. § 102?

We answer this question in the affirmative.

¹ For Sakata, we rely upon and cite to the English translation entered into the record on November 25, 2006.

² Reference to the Brief is to the Brief on Appeal (Revised) entered December 1, 2005.

A preponderance of the evidence of record supports the following Findings of Facts (FF):

1. As described in Dohjo:

The array substrate (100) includes 480 scanning lines (111) made of aluminum-yttrium (Al-Y) alloy as disposed on a glass substrate (101). . . . Here, the scanning lines (111) are made of Al-Y alloy; these may alternatively be made of molybdenum-tantalum (Mo-Ta) alloy, molybdenum-tungsten (Mo-W) alloy, aluminum (Al), or its alloy.

The array substrate (100) also includes 1,920 signal lines (110) made of Mo-W alloy, which lines extend to intersect the scanning lines (111) at substantially right angles on the glass substrate (101). . . . While signal lines (110) are made of Mo-W alloy here, these may alternatively be constituted from Mo-Ta alloy, Al or its alloy.

(Dohjo, col. 7, ll. 16-37).

2. Aluminum-yttrium (Al-Y) alloy is a low resistivity metal.
3. Mo-W and Mo-Ta alloys are high melting point metals selected from the group consisting of chrome, molybdenum, tantalum and alloys thereof.
4. Dohjo expressly describes a preferred embodiment in which scanning lines are formed of a low resistivity metal (Al-Y) and signal lines are formed of a high melting point metal selected from an alloy of molybdenum (Mo-W).

“To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently.” *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997).

Applying the preceding legal principle to the Factual Findings in the record of this appeal, we determine that a preponderance of the evidence supports the Examiner's finding of anticipation.

Dohjo, as evident from the Factual Findings above, expressly teaches each and every limitation of the claims in a preferred embodiment in which the scanning lines are formed from Al-Y and the signal lines are formed from Mo-W (FF 1-4). That Dohjo teaches alternatives to the preferred embodiment does not negate the express teaching of the reference of something having all the structure required by the claim. *See In re Sivaramakrishnan*, 673 F.2d 1383, 1384-85, 213 USPQ 441, 442 (CCPA 1982) (Claim to a polycarbonate/cadmium laurate mixture anticipated by a reference with a broad disclosure of a polycarbonate-salt mixture where the claimed cadmium laurate salt was expressly disclosed within a list of exemplary salts).

With regard to the last two paragraphs of Appellant's argument (Br. 6), Appellant contends that:

Forming the extended scanning line and extending auxiliary capacitance line only of the same conductive film as for the signal line (Cr or Mo or Ta), a lower total resistance along the scanning line is obtained without suffering from high contact resistance at the terminal ends of those lines. DOHJO uses low resistivity metal (Al) again in the terminal region (IIla of scanning pad 152 in Fig. 1 and Fig. 7), resulting in high contact resistance.

By contrast, in accordance with the present invention, a same conducting film for signal line (Cr or Mo or Ta) used for the extending line and the extending auxiliary capacitance line, having a high melting point metal, is at the same time mechanically hard and corrosion-resistant. Mechanical hardness and corrosion resistance of those metals help to avoid breakage of those lines.

This portion of Appellant's argument does not identify any error on the part of the Examiner, nor is it clear how this portion of the argument relates to what is claimed. The Examiner finds that the extended scanning line, as required by claims 1 and 3, and the extended auxiliary capacitance line, as required by claims 2 and 3, are formed, as claimed, from the same conductive material as the signal line (Answer 3 and 4). Appellant states that Dohjo uses low resistivity metal (Al) in the terminal region 111a of scanning pad 152, resulting in high contact resistance, but the claims do not limit the material of the terminal region of a scanning pad. Appellant has not shown the Examiner reversibly erred in finding that Dohjo teaches each and every structure of the claimed array.

We note that Appellant makes a conclusory statement that "Claims 1-3, 5-6, 8-12 and 15-18 recite varying combinations of structural elements, many of which cannot reasonably be "read on" the DOHJO elements cited [sic; in] the Action of 26 SEP. 2003." (Br. 4). However, Appellant does not specify what structural elements, other than those which we discussed above, are not taught by Dohjo. Appellant's broad-based statement does not sufficiently identify any particular error on the part of the Examiner.

Appellant has not established that the Examiner reversibly erred in rejecting claims 1-3, 5, 6, 8-12, and 15-18 as anticipated by Dohjo.

Obviousness of Claim 13 over Dohjo and Sakata

Claim 13 further limits the array substrate of claim 1 to one in which the scanning line is formed of partly or wholly nitrided aluminum or partly or wholly nitrided aluminum alloy. The Examiner rejects claim 13 as obvious over Dohjo in view of Sakata (Answer 6-7).

Appellant contends that “there is nothing to suggest attempting to combine these two disclosures.” (Br. 6-7). The Examiner contends that the suggestion arises from the disclosure in Sakata of nitriding to obtain low contact resistance (Answer 9).

The dispositive issue arising for the contentions of the Appellant and Examiner is: Has Appellant overcome the rejection by showing that the evidence fails to adequately support the Examiner’s finding of a reason to combine the teachings of the references?

We answer this question in the negative.

A preponderance of the evidence of record supports the following Findings of Facts (FF):

1. Dohjo is directed to forming array substrates including scanning lines of low resistivity aluminum or aluminum alloy (Al-Y) with contacts to pixel electrodes of indium tin oxide (ITO).
2. Sakata teaches that it is desirable to use aluminum or aluminum alloy for gate wiring (scanning lines) and source/drain wiring (signal lines) as it prevents signal delay. However, there is a problem of high contact resistivity (Sakata, p. 7, first full paragraph).
3. Sakata solves the contact resistivity problem by adding an impurity such as nitrogen (nitriding) to an upper layer of the aluminum or aluminum alloy (Sakata, p. 8, ll. 14-22).

“On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.” *In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) (emphasis omitted).

“Section 103 forbids issuance of a patent when ‘the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.’” *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 127 S. Ct. at 1734 (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”).

“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1739 (2007). Moreover, one of the ways in which a claim’s subject matter can be proven obvious is by establishing that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the claims. *KSR*, 127 S. Ct. at 1742. “[A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *KSR*, 127 S. Ct. at 1742.

Applying the preceding legal principles to the Factual Findings in the record of this appeal, we determine that a preponderance of the evidence supports the Examiner’s finding of a reason to make the combination.

Sakata shows that it was known in the art that the problem of contact resistivity in aluminum alloy wiring such as the scanning lines could be solved by nitriding (FF 2-3). Dohjo describes aluminum alloy scanning lines that would benefit from reduced contact resistivity (FF 1). Sakata, therefore, provides a reason for combining the elements in the manner claimed.

A preponderance of the evidence supports the Examiner's finding of a reason to combine the teachings of the references. Appellant has not overcome the rejection.

III. DECISION

The decision of the Examiner is affirmed.

IV. TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal maybe extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

tf/lis

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